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Report of the individual review of the annual submission of Italy submitted in 2013*

* In the symbol for this document, 2013 refers to the year in which the inventory was submitted, and not to the year of publication.

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I. Introduction and summary

1. This report covers the review of the 2013 annual submission of Italy, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 30 September to 5 October 2013 in Rome, Italy, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Ms. Penny Reyenga (Australia); energy – Ms. Ana Carolina Avzaradel (Brazil); industrial processes and solvent and other product use – Ms. Ils Moorkens (European Union (EU)); agriculture – Ms. Agita Gancone (Latvia); land use, land-use change and forestry (LULUCF) – Mr. Walter Oyhantçabal (Uruguay); and waste – Mr. Mikael Szudy (Sweden). Ms. Avzaradel and Ms. Reyenga were the lead reviewers. The review was coordinated by Ms. Barbara Muik (UNFCCC secretariat).

2. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1) (hereinafter referred to as the Article 8 review guidelines), a draft version of this report was communicated to the Government of Italy, which provided comments that were considered and incorporated, as appropriate, into this final version of the report. All encouragements and recommendations in this report are for the next annual submission, unless otherwise specified.

3. In 2011, the main greenhouse gas (GHG) in Italy was carbon dioxide (CO_2), accounting for 84.7 per cent of total GHG emissions[1] expressed in CO_2 equivalent (CO_2 eq), followed by methane (CH_4) (7.5 per cent) and nitrous oxide (N_2O) (5.5 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 2.3 per cent of the overall GHG emissions in the country. The energy sector accounted for 82.7 per cent of total GHG emissions, followed by the agriculture sector (6.9 per cent), the industrial processes sector (6.5 per cent), the waste sector (3.6 per cent) and the solvent and other product use sector (0.3 per cent). Total GHG emissions amounted to 488,792.02 Gg CO_2 eq and decreased by 5.8 per cent between the base year[2] and 2011. The expert review team (ERT) concludes that the description in the national inventory report (NIR) of the trends for the different gases and sectors is reasonable.

4. Tables 1 and 2 show GHG emissions from sources included in Annex A to the Kyoto Protocol (hereinafter referred to as Annex A sources), emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, elected activities under Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively. In table 1, CO_2, CH_4 and N_2O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

5. Additional background data on recalculations by Italy in the 2013 annual submission, as well as information to be included in the compilation and accounting database, can be found in annex I to this report.

[1] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base-year emissions include emissions from sources included in Annex A of the Kyoto Protocol only.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year[a] to 2011

			Gg CO_2 eq								*Change (%)*
		Greenhouse gas	*Base year[a]*	*1990*	*1995*	*2000*	*2008*	*2009*	*2010*	*2011*	*Base year–2011*
Annex A sources		CO_2	434 656.30	434 656.30	444 943.68	462 277.69	463 921.58	415 088.93	425 499.38	414 239.22	–4.7
		CH_4	43 760.90	43 760.90	44 335.69	45 843.74	38 191.59	38 013.00	37 290.20	36 567.66	–16.4
		N_2O	37 396.31	37 396.31	38 422.16	39 483.23	29 615.20	28 052.98	27 075.62	26 873.17	–28.1
		HFCs	351.00	351.00	671.29	1 985.67	7 512.98	8 163.94	8 744.58	9 306.04	2551.3
		PFCs	2 486.74	2 486.74	1 266.38	1 217.43	1 500.59	1 062.81	1 330.83	1 454.54	–41.5
		SF_6	332.92	332.92	601.45	493.43	435.53	398.02	373.27	351.38	5.5
KP-LULUCF	Article 3.3[b]	CO_2					–6 035.45	–6 861.53	–7 451.38	–6 102.03	
		CH_4					20.37	20.59	12.99	19.17	
		N_2O					0.12	0.13	0.23	0.12	
	Article 3.4[c]	CO_2	NA				–27 992.21	–30 293.52	–31 334.19	–24 021.93	NA
		CH_4	NA				47.53	48.04	30.31	44.73	NA
		N_2O	NA				0.23	0.24	0.15	0.21	NA

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year for cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol is 1990. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

Table 2
Greenhouse gas emissions by sector and activity, base year[a] to 2011

			Gg CO_2eq							*Change (%)*
	Sector	*Base year[a]*	*1990*	*1995*	*2000*	*2008*	*2009*	*2010*	*2011*	*Base year–2011*
Annex A	Energy	417 736.09	417 736.09	431 111.04	449 686.56	449 202.26	405 192.17	415 299.28	404 443.53	–3.2
	Industrial processes	38 389.92	38 389.92	35 928.88	36 249.03	35 668.37	30 743.13	31 829.82	31 640.92	–17.6
	Solvent and other product use	2 454.62	2 454.62	2 234.87	2 301.35	1 953.73	1 829.28	1 676.71	1 656.28	–32.5
	Agriculture	40 738.59	40 738.59	40 520.46	40 135.38	36 015.43	34 776.85	33 722.59	33 530.43	–17.7
	Waste	19 664.96	19 664.96	20 445.39	22 928.87	18 337.68	18 238.24	17 785.50	17 520.85	–10.9
	LULUCF	NA	–12 153.74	–30 382.90	–25 834.57	–36 670.33	–39 920.04	–43 340.86	–30 590.07	NA
	Total (with LULUCF)	**NA**	**506 830.43**	**499 857.76**	**525 466.63**	**504 507.14**	**450 859.63**	**456 973.03**	**458 201.95**	NA
	Total (without LULUCF)	**518 984.17**	**518 984.17**	**530 240.65**	**551 301.20**	**541 177.47**	**490 779.67**	**500 313.89**	**488 792.02**	–5.8
	Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c] Afforestation and reforestation					–6 390.36	–7 217.78	–7 816.91	–6 462.69	
	Article 3.3[c] Deforestation					375.40	376.97	378.74	379.95	
	Total (3.3)					**–6 014.96**	**–6 840.81**	**–7 438.17**	**–6 082.74**	
	Article 3.4[d] Forest management					–27 944.44	–30 245.24	–31 303.73	–23 976.98	
	Article 3.4[d] Cropland management	NA				NA	NA	NA	NA	NA
	Article 3.4[d] Grazing land management	NA				NA	NA	NA	NA	NA
	Article 3.4[d] Revegetation	NA				NA	NA	NA	NA	NA
	Total (3.4)	**NA**				**–27 944.44**	**–30 245.24**	**–31 303.73**	**–23 976.98**	**NA**

Abbreviations: KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable.

[a] "Base year" for sources included in Annex A to the Kyoto Protocol refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year for cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol is 1990. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2013 annual inventory submission was submitted on 15 April 2013 and resubmitted on 22 May 2013; it contains a complete set of common reporting format (CRF) tables for the period 1990–2011 and an NIR. Italy also submitted the information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 15 April 2013. The annual submission was submitted in accordance with decision 15/CMP.1.

7. The full list of materials used during the review is provided in annex II to this report.

2. Overall assessment of the inventory

8. Table 3 contains the ERT's overall assessment of the annual submission of Italy. For recommendations for improvements related to cross-cutting issues for specific categories, please see the paragraphs cross-referenced in the table.

Table 3
The expert review team's overall assessment of the annual submission

		General findings and recommendations
The expert review team's (ERT's) findings on completeness of the 2013 annual submission		
Annex A sources[a]	Complete	Mandatory: None Non-mandatory: Emissions from the memo item multilateral operations have not been estimated due to a lack of data
Land use, land-use change and forestry[a]	Complete	Mandatory: Italy has reported the dead organic matter pool for grassland and cropland converted to settlements as "NE" (see para. 48 below) Non-mandatory: Emissions from the voluntary LULUCF categories of settlements remaining settlements and wetlands remaining wetlands have not been estimated
KP-LULUCF	Not complete	Italy has reported emissions and removals from some forest plantations which meet the definition of forest land under croplands and, as such, does not include these plantations under

		General findings and recommendations
		any of the mandatory or elected KP-LULUCF activities. To ensure completeness the ERT recommends that Italy classify these plantations as forest and report them in the appropriate activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (see paras. 55 and 64 below)
The ERT's findings on recalculations and time-series consistency in the 2013 annual submission	Generally consistent	Recalculations have been performed in accordance with the IPCC good practice guidance and are generally transparently explained in the NIR and the CRF tables Possible time-series inconsistencies have been identified for cement and lime production following the introduction of EU ETS data. The ERT recommends that Italy provide additional information to explain how time-series consistency has been maintained in the next NIR submission (see paras. 32 and 39 below)
The ERT's findings on verification and quality assurance/quality control procedures in the 2013 annual submission	Sufficient	Italy performs category-specific QA/QC procedures and verification activities. These checks, along with planned improvements, are detailed in the annual QA/QC plan
The ERT's findings on the transparency of the 2013 annual submission	Generally sufficient	Information on how confidential data are handled is not reported in either the QA/QC plan or the relevant section of introduction chapter of the NIR. To improve transparency Italy is encouraged to include this information in the next submission The ERT also identified areas where Italy can further improve the transparency of its sectoral reporting, particularly in relation to the justification and/or elaboration of country-specific values and approaches in the energy sector (see paras. 26–27 below), the industrial processes sector (see paras. 32, 34 and 38 below), the agriculture sector (see para. 43 below), the LULUCF sector (see para. 57 below) and the waste sector (see para. 60 below)

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, CRF = common reporting format, EU ETS = European Union Emissions Trading System, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, IPCC good practice guidance = Intergovernmental Panel on Climate Change *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, NE = not estimated, NIR = national inventory report, QA/QC = quality assurance/quality control.

[a] The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty*

Management in National Greenhouse Gas Inventories, or the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

3. Description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Inventory planning

9. The NIR described the national system for the preparation of the inventory. The Institute for Environmental Protection and Research (ISPRA) has overall responsibility for the national inventory. The key functions of ISPRA include the planning, preparation and management of the annual submission. ISPRA is responsible for preparing the national system and quality assurance/quality control (QA/QC) plans, developing methods, collecting activity data (AD), preparing emission estimates, reporting, undertaking QA/QC activities and archiving. The Ministry for the Environment, Land and Sea is responsible for officially approving the annual submission and the national system plan.[3]

10. The Ministry for the Environment, Land and Sea is responsible for the management of the National Registry for Carbon Sinks, which has been established to provide emissions and removals estimates for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. Other agencies are also involved in the preparation of the inventory, primarily through the collection and provision of data (e.g. statistics on national energy balance, transport, agriculture, national forest inventory (NFI) and waste).

Inventory preparation

11. Table 4 contains the ERT's assessment of Italy's inventory preparation process.

Table 4
Assessment of inventory preparation by Italy

		General findings and recommendations
Key category analysis		
Was the key category analysis performed in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF)?	Yes	Level and trend key category analysis performed, including and excluding LULUCF
Approach followed?	Tier 1 and tier 2	
Were additional key categories identified using a qualitative approach?	No	

[3] The annual national system plan describes the national system, including all updated information on the institutional, legal and procedural arrangements for estimating GHG emissions and removals and for reporting and archiving inventory information.

		General findings and recommendations
Has the Party identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory?	Yes	Under Convention reporting, lands converted to settlements and grassland are key categories. The ERT recommends that Italy provide additional information in the NIR to document why these categories and, hence deforestation, are not identified as key under Kyoto Protocol reporting
Does the Party use the key category analysis to prioritize inventory improvements?	Yes	
Are there any changes to the key category analysis in the latest submission?	No	Two additional categories are identified as key in the 2013 submission: CO_2 from fugitive emissions for oil and gas operations and CO_2 mobile combustion (civil aviation)
Assessment of uncertainty analysis		
Approach followed?	Tier 1	Separate tier 2 analysis has been undertaken for some key categories
Was the uncertainty analysis carried out in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	Yes	To improve the description of the analysis, Italy is encouraged to provide information on the probability distributions applied to AD, EFs, other parameters and the data sources in the NIR or in a separate reported referenced in the NIR
Quantitative uncertainty (including LULUCF)	Level = 5.1% Trend = 4.2%	
Quantitative uncertainty (excluding LULUCF)	Level = 3.4% Trend = 2.6%	

Abbreviations: AD = activity data, EF = emission factor, LULUCF = land use, land-use change and forestry, NIR = national inventory report.

Inventory management

12. Italy has a centralized archiving system, which includes the archiving of disaggregated emission factors (EFs) and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements. ISPRA is responsible for maintaining the archiving system. Although some components of the archive are not available electronically, such as scientific papers and industry correspondence, these are kept in hard

copy with information on their location stored on the reference database. During the review, the ERT was provided with the requested additional archived information.

4. Follow-up to previous reviews

13. The ERT commends Italy for having implemented a significant number of the recommendations made in the previous review report. In particular, in the energy sector Italy now reports emissions for some previously un-estimated fugitive emission subcategories (see para. 16 below) and in LULUCF the dead organic matter pool in forest land and fires in non-forest lands are now estimated and reported (see para. 48 below), thereby improving the completeness of the inventory. In all sectors Italy has made efforts to provide additional information in the NIR to address recommendations to improve transparency (see paras. 17, 23, 24, 27, 32, 49 and 61 below).

5. Areas for further improvement identified by the expert review team

14. During the review, the ERT identified a number of areas for improvement, including some related to specific categories. These are listed in the relevant chapters of this report and in table 8.

B. Energy

1. Sector overview

15. The energy sector is the main sector in the GHG inventory of Italy. In 2011, emissions from the energy sector amounted to 404,443.53 Gg CO_2 eq, or 82.7 per cent of total GHG emissions. Since 1990, emissions have decreased by 3.2 per cent. The key driver for the fall in emissions is the manufacturing industries and construction subcategory, which has decreased by 29.6 per cent (25,696.82 Gg CO_2 eq) since 1990. Between 1990 and 2004, emissions from the sector increased by 13.4 per cent, followed by a decrease of 14.6 per cent between 2004 and 2010. From 2004 on, emissions have decreased as a result of policies adopted at the European and national levels to promote the use of renewable energy sources. A shift from petrol products to natural gas has also been observed following the commencement of the EU Emissions Trading System (EU ETS). After 2009, the economic downturn led to a further decrease in emissions. Within the sector, 32.4 per cent of the emissions were from energy industries, followed by 29.1 per cent from transport, 21.3 per cent from other sectors and 15.1 per cent from manufacturing industries and construction. Fugitive emissions from fuels accounted for 1.8 per cent and other (energy) accounted for 0.1 per cent.

16. The energy sector is complete with respect to the coverage of categories, gases and years, is accurate and in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines). Italy has improved the completeness of the inventory with the inclusion of fugitive emissions from oil and gas exploration activities (CH_4, CO_2 and N_2O); pipeline oil transport (CH_4 and CO_2); and CO_2 emissions from underground mines for mining and post-mining activities for the whole time series. CO_2 emissions from the use of carbonates in ferroalloys production, previously reported in both the industrial processes sector and the energy sector have been deleted from the energy sector (iron and steel subcategory) in order to avoid double counting.

17. The ERT commends Italy for addressing most of the recommendations made in the previous review report. Improvements in response to the recommendations include: the

correction of some inconsistencies within the NIR and the notation keys for fugitive emissions in the natural gas (other leakage) subcategory; the provision of additional information in the NIR on the method used to split fuels between domestic navigation and international marine bunkers; the EFs for biomass fuels consumed in each energy category; and the explanations of the average implied emission factors (IEFs) for other fuels and fossil waste. Additional improvements in response to recommendations are outlined below.

2. Reference and sectoral approaches

18. Table 5 provides a review of the information reported under the reference approach and the sectoral approach, as well as comparisons with other sources of international data. Issues identified in table 5 are more fully elaborated in paragraphs 19–22 below.

Table 5
Review of reference and sectoral approaches

		Paragraph cross-references
Difference between the reference approach and the sectoral approach	Energy consumption: 35.06 PJ, 0.61% CO_2 emissions: –1,038.08 CO_2 eq, –0.27%	
Are differences between the reference approach and the sectoral approach adequately explained in the NIR and the CRF tables?	Yes	
Are differences with international statistics adequately explained?	Yes	20
Is reporting of bunker fuels in accordance with the UNFCCC reporting guidelines?	Yes	21
Is reporting of feedstocks and non-energy use of fuels in accordance with the UNFCCC reporting guidelines?	Yes	22

Abbreviations: CRF = common reporting format, NIR = national inventory report, UNFCCC reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories".

Comparison of the reference approach with the sectoral approach and international statistics

19. No problems were identified with regard to the difference between the reference and sectoral approaches. The previous ERT had identified that the difference previously observed was due mainly to emissions for the category other (energy), which were included in the sectoral approach, but not in the reference approach. In response to previous ERT recommendations, Italy has manually included AD and emissions for the category other (energy) in the estimation of the reference approach, reducing the difference in emissions between the reference and sectoral approaches from approximately –1.8 per cent to –0.3 per cent. In addition, Italy reduced the difference between the reported refinery feedstocks exports (CRF table 1.A(b)) and the International Energy Agency (IEA) data for the period 1992–1997. The ERT commends the Party for addressing these issues.

20. Differences between the CRF tables and IEA figures have been identified for other bituminous coal production as well as for gas/diesel oil exports: for 2000, bitaminous production is reported only in the CRF tables, but not to IEA; for 2010, the gas/diesel oil exports figures reported to IEA are 9.9 per cent higher than those reported in the CRF tables; and other kerosene exports reported in the CRF tables are approximately five times higher than those reported to IEA. During the review, Italy explained that the Ministry of Economic Development (MED) is responsible for the official communication with IEA and the inventory team is not aware of the rules to update international energy statistics, but further information could be sought from MED. The ERT encourages the Party to investigate the process of sending information to IEA and to ensure consistency between IEA figures and those provided by the Party in its annual submission.

International bunker fuels

21. The NIR states that there is a discrepancy of 11.4 per cent in fuel consumption in international marine bunkers between IEA (the higher figure) and the CRF tables because the energy statistics used by IEA are not updated. In response to a question raised by the ERT during the review, Italy explained that every year ISPRA provides a complete time series of domestic and international data to MED, which is responsible for the official communication to IEA. The ERT encourages the Party to further investigate the process of sending information to IEA in order to ensure that recalculations to the time series are reflected in the IEA figures.

Feedstocks and non-energy use of fuels

22. Italy provided comments in the CRF tables with regard to the allocation of some fuels to naphtha in order to explain the negative figures obtained for the fraction of carbon stored in some fuels as a result of an input and output balance calculation. For lubricants, the Party estimated the carbon stored as the difference between the amount of lubricants and the amount of recovered lubricant oils. During the review, Italy also provided more information on the balance of input and output and explained that fractions of carbon oxidized are derived from actual carbon oxidized quantities calculated by the Party through this balance. As these fractions are derived from actual measurements they do not correspond to any default values and may vary over time. The fractions are country-specific and therefore more suitable to the country's conditions. The ERT recommends that Italy include information on the specific calculation of the fraction of carbon oxidized in the NIR of its next annual submission.

3. Key categories

Stationary combustion: liquid fuels – CO_2

23. Following a recommendation made in the previous review report, Italy provided in the NIR a table with liquid fuels consumption for petroleum refining for the whole time series, broken down by fuel type to explain the drivers behind the increasing trend of the CO_2 IEF for consumption of liquid fuels in petroleum refining. The Party also explained in the NIR that since 2005, the weighted average of the CO_2 EF reported by operators in the framework of the EU ETS has been used for petroleum coke, refinery gas and synthesis gas from heavy residual fuels and that the trend in the IEF is driven by the mix in the fuels of the sector. The ERT commends the Party for improving the transparency of the report.

Stationary combustion: solid fuels – CH_4

24. In response to a recommendation made in the previous review report, Italy has provided additional information in the NIR to explain the trends and large inter-annual variations in the CH_4 IEF for manufacture of solid fuels and other energy industries. Italy explained in the NIR that the decreasing trends in the IEF between 1990 and 2011 were

driven by the coke production trend. The large variation in 2009 was due to a 40.0 per cent decrease in national coke production relative to the previous year, which led to a loss in efficiency of the production plants and an increase in emissions by product unit (IEF) for that year. Italy has also provided in the NIR additional information to explain the high CH_4 IEF for the iron and steel subcategory in response to a recommendation made in the previous review report. The ERT commends the Party for improving the transparency of the report.

25. The previous review report encouraged Italy to disaggregate process-related emissions from the iron and steel subcategory and to report process-related emissions in the industrial processes sector. In response to a question raised by the ERT, the Party stated that CH_4 process emissions for pig iron and steel production are already allocated to the industrial processes sector; fugitive CH_4 emissions from coke production are reported under fugitive emissions; and CH_4 emissions from the combustion of fuels are allocated to the energy sector. The ERT recommends that Italy include more detailed information in the NIR on the calculations performed by the Party to disaggregate and allocate emissions, so as to improve transparency of reporting.

Stationary combustion: gaseous fuels, biomass – CO_2, CH_4 and N_2O

26. In public electricity and heat production, while CO_2 emissions dropped by 1.5 per cent, CH_4 and N_2O emissions rose in the same period by 13.9 per cent and 11.1 per cent, respectively. In response to questions raised by the ERT during the review, the Party explained that this is due to the increase in natural gas and biomass use, which drives the trend of the category. The ERT recommends that the Party include this explanation in the NIR in order to improve the transparency of the report.

Stationary combustion: other fuels – CH_4

27. In response to a recommendation made in the previous review report, Italy provided information in the NIR on the other fuels used for the public electricity and heat production, commercial/institutional and chemicals subcategories. For public electricity and heat production, other fuels include minor amounts of other liquid, solid and gaseous fuels from a mix of industrial wastes such as plastics, rubber and solvents, and synthesis gas from heavy residual fuel, while for the commercial/institutional subcategory other fuels refers to the amount of fossil waste burned in incinerators with energy recovered. For chemicals, other fuel includes the consumption of residual gases from chemical processes. Although transparency has been improved with the provision of this information, EFs have only been reported in the NIR for public electricity and heat production. The ERT reiterates the recommendation made in the previous review report that Italy include in the NIR the EFs used in all subcategories.

Fugitive emissions: oil and natural gas – CO_2, CH_4 and N_2O[4]

28. N_2O emissions from refining storage are reported under flaring in refineries. Leakages in industrial and power stations and commercial and domestic uses as well as emissions from venting have not been disaggregated. The ERT encourages Italy to further disaggregate the other fugitive emissions categories. In addition, Italy uses the notation key "NO" (not occurring) for CO_2 and CH_4 exploration emissions, while a note in the CRF table indicates that these emissions are accounted for in sub-category 1.B.2.b.ii Production. The Party clarified that the notation key is correct, as emissions do not occur in the years when it is reported as "NO", and that the comments are outdated. The ERT recommends

[4] Not all emissions related to all gases under this category are key categories, particularly N_2O emissions. However, since the calculation procedures for issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

that Italy review and correct the comments provided in the cells with regard to this category.

C. Industrial processes and solvent and other product use

1. Sector overview

29. In 2011, emissions from the industrial processes sector amounted to 31,640.92 Gg CO_2 eq, or 6.5 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 1,656.28 Gg CO_2 eq, or 0.3 per cent of total GHG emissions. Since 1990, emissions have decreased by 17.6 per cent in the industrial processes sector, and decreased by 32.5 per cent in the solvent and other product use sector. The key drivers for the fall in emissions in the industrial processes sector are decreasing production in the categories of mineral products, chemical industry and metal production; the implementation of abatement equipment in adipic acid and nitric acid production; and the change in process technology in aluminium production. Within the industrial processes sector, 53.7 per cent of the emissions were from mineral products, followed by 30.8 per cent from consumption of halocarbons and SF_6, 5.5 per cent from metal production and 6.0 per cent from chemical industry. The production of halocarbons and SF_6 accounted for 4.0 per cent.

30. The ERT concludes that Italy's industrial processes inventory is of good quality. The inventory is complete with respect to the coverage of categories, gases and years and is in accordance with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. Uncertainties, recalculations, QA/QC procedures and planned improvements are described in the NIR at the appropriate category level. The descriptions of the methodologies and EFs used are generally transparent; however, time-series consistency and transparency could be improved for cement production and lime production (see paras. 32, 38 and 39 below) and transparency of the refrigeration methodology could be improved (see paras. 34, 35 and 37 below).

2. Key categories

Cement production – CO_2

31. For the period 1990–2003, Italy has used a cement production EF equal to 540 kg CO_2/t clinker. This EF was provided by AITEC, the Italian Cement Association, based on a World Business Council for Sustainable Development calculation tool. From 2004 on, EFs are based on the data reported within the frame of the European Pollutant Emission Register and the EU ETS. As more detailed information about raw kiln inputs and the processes became available following the introduction of the EU ETS, the IEF since 2003 varies annually (ranging between 518.24 and 531.78 kg CO_2/t clinker) and is slightly lower than before 2003.

32. In response to a recommendation made in the previous review report, Italy provided a statistical analysis of the clinker facility-level IEFs for the years 2003 and 2005–2011. Italy stated in the NIR that the IEFs based on national ETS data from 2003 are in line with the value of 540 kg CO_2/t clinker used for the period 1990–2003 as 88.0 per cent of the facilities had an IEF in the range of 535.00–549.99 kg CO_2/t clinker and 75.0 per cent were in the range of 540.00–544.99 kg CO_2/t clinker. The ERT recommends that Italy in its next submission provide more information on the underlying drivers for the change in IEFs since 2003 and on how time-series consistency has been maintained. As an example, it could be clarified whether the lower IEFs are due to a change in the composition of the raw material, changes in the process or changes in estimation methods. The ERT also recommends that Italy provide more information about the method used to determine

process emissions from cement production under the EU ETS and indicate whether this method is based on kiln input or clinker output.

Iron and steel – CO_2

33. The previous review report encouraged Italy to disaggregate the process emissions due to the use of coke in iron and steel production from total emissions reported in fuel combustion and report them under the industrial processes sector. During the review, Italy reported on the preliminary results of an industry survey which found that there is no accurate information by which to disaggregate the emissions. As any arbitrary disaggregation would not reflect the real situation, the ERT agreed that leaving the total emissions from the use of coke in the iron and steel industry in the energy sector is appropriate. The ERT recommends that Italy report the details of the survey in the NIR in its next annual submission.

Consumption of HFCs and SF_6 – HFCs

34. HFC emissions from domestic refrigeration, small and large commercial units and chillers have all been reported under domestic refrigeration in the NIR and the CRF table 2(II). As a consequence, it is not clear which product life factors and product manufacturing factors have been used for the different subcategories. This reduces transparency and prevents the assessment of comparability of these factors. During the review, Italy provided the ERT with the underlying calculations used to estimate emissions from refrigeration. These calculations show that Italy could report emissions from certain of the subcategories separately as the consumption of blends and gases are attributed to these different subcategories (data provided by the HFC manufacturer) and different country-specific product life and product manufacturing factors are used for each subcategory. The ERT strongly recommends that Italy report separately the AD, product life factors, product manufacturing factors and emissions for domestic and commercial refrigeration in CRF table 2(II) and document the factors used in the NIR of the next annual submission.

35. As outlined in paragraph 34 above, Italy uses a bottom-up method to estimate emissions from refrigeration. In addition, Italy stated in the NIR and CRF tables that the emissions from equipment disposal have been included in the emissions during the product's life for the whole time series. In order to improve the transparency of the inventory, the ERT recommends that Italy improve the description of the estimation methodology and use a top-down approach to cross-check the final emission estimate.

36. The country-specific product life factor for HFCs in large commercial refrigeration used by Italy is 5.0 per cent. The ERT identified that this is low compared with the default value range provided in the IPCC good practice guidance (10–30 per cent) and compared with the average of product life factors for commercial refrigeration of other European countries in 2011 (average: 11.0 per cent; range 2–21 per cent). During the review, Italy provided further information on the source of this factor; however, this information did not explain the reason for these differences. The ERT noted that the country-specific product life factor of HFCs in large commercial refrigeration was not sufficiently substantiated and thus concluded that the emissions could have been underestimated and included it in the list of potential problems and further questions.

37. In response to the list of potential problems and further questions raised by the ERT, Italy provided additional information, based on consultations with relevant industry associations, which confirmed that the product life factor for large commercial refrigeration is too low and should be 12.0 per cent. However, during these consultations it was also identified that the product life factor for chillers and the product manufacturing factors for both refrigeration and chillers were too high. The net result of implementing all the corrected factors would be a reduction in the 2011 emissions of 502.7 Gg CO_2 eq. The ERT strongly recommends that Italy use the revised factors in the estimation of emissions in its

next annual submission and that it document the methods appropriately in the NIR by specifying the manufacturing and product life factors used for each application.

3. Non-key categories

Lime production – CO_2

38. The NIR states that for the period 2005–2008 the emissions from lime production have been estimated using production data from the Italian National Institute of Statistics (ISTAT) and detailed information from the EU ETS, while from 2009 on the EU ETS has provided plant-specific lime production and CO_2 emissions data. However, the NIR provides no information on how the EFs for years prior to 2005 are estimated. During the review, Italy provided the ERT with the information that the EFs for the period 2000–2003 are based on detailed information from the national allocation plan and that the EFs for 1990–1999 are based on the average of the 2000–2003 EFs. To improve transparency and information about consistency, the ERT recommends that Italy provide more information about the methods used to estimate emissions from lime production for the entire time series. Italy should also clearly document whether the method is based on the amount of calcium and magnesium carbonate from the raw material, or on the amount of calcium and magnesium oxides in the lime produced for each of the periods.

39. For the period 1990–2004, the IEF for lime production is 0.8 t CO_2/t lime, then from 2005 on, following the introduction of the EU ETS, the IEF changes to 0.7 t CO_2/t lime. Since more detailed information about raw kiln input and the process became available with the introduction of the EU ETS, the IEF can be specified more accurately. The ERT recommends that Italy in its next annual submission provide more information about the underlying drivers for the change in the IEF since 2005 and on how time-series consistency has been maintained. As an example, it is not clear whether the lower IEFs are due to a change in the composition of the raw material, changes in the process or changes in the estimation methods.

D. Agriculture

1. Sector overview

40. In 2011, emissions from the agriculture sector amounted to 33,530.43 Gg CO_2 eq, or 6.9 per cent of total GHG emissions. Since 1990, emissions have decreased by 17.7 per cent. The key driver for the fall in emissions is the reduction in the number of animals, the areas cultivated and crop production. Within the sector, 45.8 per cent of the emissions were from agricultural soils, followed by 32.1 per cent from enteric fermentation, 17.4 per cent from manure management and 4.6 per cent from rice cultivation. The remaining 0.1 per cent was from field burning of agricultural residues. Emissions from prescribed burning of savannas have been reported as "NO".

41. The ERT concludes that Italy's agriculture inventory is of good quality. The inventory is complete with respect to the coverage of categories, gases and years, is accurate and in accordance with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. Uncertainties, recalculations, QA/QC procedures and planned improvements are described in the NIR at the appropriate category level. The descriptions of the collection of national statistics and the methodologies and EFs used are generally transparent; however, transparency could be improved for some subcategories of manure management, agricultural soils and field burning of agricultural residues (see paras. 43–45 below).

2. Key categories

Manure management – CH_4

42. Italy used a tier 2 approach and country-specific EFs to estimate CH_4 emissions from manure management of cattle, buffalo and swine. For other livestock categories the tier 1 method and the default values from the Revised 1996 IPCC Guidelines were used, which is in accordance with the IPCC good practice guidance. The EFs applied are a weighted average of the cool and temperate IPCC default EFs reflecting the different climates which occur in the Italian provinces.

43. For the estimation of emissions from swine, a country-specific methane emission rate has been experimentally determined by the Research Centre on Animal Production. The methane emission rates used are 411 CH_4/100 kg live weight/day for fattening swine and 471 CH_4/100 kg live weight/day for sows. The NIR states that a reduction of 8.0 per cent for covered storage structures is then applied to the methane emission rate. During the review Italy explained that the emission rates are based on experimental measurements on uncovered storage systems and that the 8.0 per cent emission reduction is the integrated figure of the proportion of animal waste allocated to covered storage systems and the difference in emissions rates for covered systems. To improve transparency the ERT recommends that Italy document the methods used to estimate the 8.0 per cent emission reduction in the next NIR submission, including information on the share of covered/uncovered storage and the emissions rate for covered storage systems. The ERT also observed that there has been a rapid increase in biogas recovery in recent years which is likely to have increased the share of covered storage, reducing the accuracy of the 8.0 per cent value. The ERT therefore recommends that Italy review and revise this value, as appropriate, to take into consideration changes in waste management through the time series.

Agricultural soils – N_2O

44. Italy used tier 1 and country-specific methods which are in line with the IPCC good practice guidance for the estimation of direct and indirect emissions from agricultural soils. To estimate emissions associated with crop residues, the NIR states that data on annual crop production and country-specific data on residue/crop product ratios and dry matter content by type of crop are used. In the NIR (table 6.27) only total crop production is presented. During the review, Italy provided the ERT with the production data for all crop types (cereals, pulses, tubers and roots, and vegetables) and the parameters which are used to calculate emissions. The ERT recommends that Italy, in its next annual submission, include information about each crop production type and appropriate parameters for relevant crop production categories which are used for the calculation of emissions to improve transparency.

3. Non-key categories

Field burning of agricultural residues – CH_4 and N_2O

45. In the NIR (page 182) it is stated that a country-specific methodology is used to estimate emissions from field burning of agricultural residues. In response to a question raised by the ERT during the review, Italy explained that the Revised 1996 IPCC Guidelines methodology was used, but with country-specific crop parameters derived from national studies (CESTAAT, 1998). The ERT recommends that Italy correct the identification of the methodology used for field burning of agricultural residues in the NIR and in CRF table summary 3 in the next submission.

E. Land use, land-use change and forestry

1. Sector overview

46. In 2011, net removals from the LULUCF sector amounted to 30,590.07 Gg CO_2 eq. Since 1990, net removals have increased by 151.7 per cent. The key driver for the rise is the net removals from forest land, which have increased by 12,381.63 Gg CO_2 eq, or 72.4 per cent. A major contributor to this trend was the 21.8 per cent increase in the area reported under forest land remaining forest land. The annual area burned by fires also has a significant influence on the trends (e.g. large fires in 2007 resulted in significantly lower net removals). Within the sector, forest land contributed to net removals with 29,479.71 Gg, followed by removals of 7,851.61 Gg from grassland. Settlements and cropland had net emissions of 3,397.38 Gg and 3,343.87 Gg, respectively. Cropland was a sink in the base year and became a source in 2011, while grassland was a source in the base year and a sink in 2011.

47. Italy has made recalculations between the 2012 and 2013 annual submissions (see table 9) that have improved the accuracy of the inventory. The reasons for the recalculation were well documented with the exception of the changes made to forest land remaining forest land (see para. 51 below). The ERT recommends that Italy provide detailed explanations for all recalculations in future submissions.

48. The LULUCF inventory is complete with respect to the coverage of categories but the dead organic matter pool for grassland and cropland converted to settlements has been reported as "NE" (not estimated). The Party reported in the CRF tables that this is due to lack of information. If conversion is from annual crops or pasture, as indicated by the reporting of "NO" for living biomass, the ERT considers that dead organic matter could also be considered to be "NO". The ERT therefore recommends that Italy assess which type of cropland and grassland is converted to settlements and review the use of notation keys. Since the 2012 submission, Italy has improved completeness by estimating and reporting the dead organic matter pool in forest land and fires in non-forest land.

49. The methodologies used to estimate the emissions and removals are generally in line with the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) for all land categories, sources and sinks. The descriptions in the NIR of the AD, emission and removal factors, and methods used are generally transparent. Additional information on the tier 3 For-est model has been provided in the NIR (sections 7.2.4 and 10.3.1.1) in response to recommendations made in the previous review report. However, to further improve transparency the ERT encourages Italy to include in the NIR the link to the paper by Federici et al. (2008) which describes the For-est model.[5]

50. Italy has reported land-use change matrices for every year in the period 1990–2011, using data from a combination of sources: time series of national land-use statistics, NFIs and expert judgement in the case of land-use transitions. In the NIR, Italy reported that, in future annual submissions, the land-use matrices will be based on data collected within the framework of the National Registry of Forest Carbon Sinks. Under the registry framework a national land-use inventory (IUTI) has been completed for the years 1990, 2000 and 2008 based on data from the National Institute of Statistics, the National Forestry Service and SIN (Sistema Informativo Nazionale per lo sviluppo dell´agricoltura). The process of collection, validation and verification of the 2012 IUTI data is currently ongoing. The ERT reiterates the recommendation made in the previous review report that Italy use the IUTI data to update the land-use matrices and recalculate the estimates for the period 1990–2011 in its next annual submission.

[5] <http://www.sisef.it/iforest/contents/?id=ifor0457-0010086>.

2. Key categories

Forest land remaining forest land – CO_2

51. The forest land remaining forest land estimate was recalculated in the 2013 submission, resulting in a 20.2 per cent decrease in the net removals in 2010 for this category. The main explanation provided for the recalculation was the change in the AD, with the areas in this category being revised down for the entire time series (by 17.4 per cent in 2010 from 8,994.68 kilohectares (kha) to 7,422.40 kha). The reason for this change was not adequately explained in the NIR. The ERT recommends that Italy improve the explanation of how the AD are derived in its next annual submission.

52. Italy has used the tier 3 For-est model developed by Federici et al. (2008) to estimate carbon changes from the growing stocks. The model uses an age-independent relationship for deriving the forest growth increment from growing stocks. This approach is more useful, in particular for natural stands, than a classical age–growth relationship, and allows the derivation of the other carbon budget components from the growing stock. The single input – growing stock – is derived from NFIs, and can be easily verified by plots or remote sensing techniques. The methodology permits the updating of stock changes for the years between NFIs, as required by the IPCC good practice guidance and IPCC good practice guidance for LULUCF. Italy has updated/revised some of the model inputs and parameters used by Federici et al. (2008). Following a recommendation made in the previous review report, Italy has provided additional information in the NIR on the parameters retained from that report and the AD, coefficients and relationships which have been updated/revised.

53. Italy has reported that the IPCC tier 1 method for mineral soils for forest land remaining forest land has been applied and as such has assumed no change in carbon stocks. However, in the same section of the NIR (section 7.2.4 page 200) it is also stated that changes in minerals soils for forest land remaining forest land have been estimated. The ERT notes that it is only on reading section 10.3.1.2 (page 276) that it becomes clear that the estimates are made using an alternative method in order to demonstrate that forest management soil pool is not a source. The ERT therefore recommends that Italy improve the clarity of the NIR text in the next annual submission.

Cropland remaining cropland – CO_2

54. For 2011, Italy reported 177,000 ha of forest plantations under cropland. These plantations comprise eucalyptus and other broadleaf coppices, poplar and other broadleaf stands, and conifers and other stands. The NIR states that these plantations, which meet the forest threshold criteria, are considered as croplands because they consist of very short forestry rotations (2–5 years) in rotation with annual crops and are primarily used as energy crops. The ERT noted that these plantations are considered a forestry category in the NFIs of 1985 and 2005 (categories 18, 19 and 20) and that they are included in the Global Forest Resources Assessment data submitted to the Food and Agriculture Organization of the United Nations. According to a publication provided by Italy during the review (Di Matteo et al., 2012), the area of these very short-term plantations (for energy) is only around 7,000 ha, which is a small proportion (4.0 per cent) of the total plantations area reported in 2011. During the review, the Party explained that the remaining plantations were generally poplars in longer rotations (8–12 years), which were used for timber production.

55. Based on information provided during the review, the ERT concluded that only the lands with very short rotations of one or two cycles (e.g. 2 years each in rotation with annual crops), could be considered agricultural land and reported under cropland, but that plantations with longer rotations, such as 8–12 years, which are for timber production and meet the national definition of forest, should be reported under forest land. The ERT recommends that Italy for its next annual submission either report all areas of plantations in

forest land or alternatively disaggregate the areas of plantations and report in cropland only those considered very short rotations used as energy crops.

Land converted to settlements – CO_2

56. Following an analysis of data reported by other European countries with similar conditions, Italy updated the average value of living biomass of woody crops from 63 to 10 t carbon/ha in the cropland category based on the factor used by Spain. The ERT acknowledges this improvement but identified that this value had not been updated for the estimation of the changes in carbon stocks when croplands are converted to settlements, resulting in an overestimation of emissions. The ERT recommends that Italy correct the value of the carbon content of the biomass of woody crops for land converted to settlements in the next annual submission.

57. For forest land converted to settlements (and other land categories) the soil organic carbon content value for forest lands at different time periods was estimated from the above-ground carbon amount with linear relations differentiated by forestry use – stands (resinous, broadleaves, mixed stands) and coppices, based on data collected within the European project BioSoil (for soils) and a Life+ project FutMon for the above-ground biomass. The ERT notes that this method could, theoretically, introduce significant uncertainties if the linear relationships are not validated and reiterates the recommendation made in the previous review report that the Party provide further documentation on the adequacy of this method for the national circumstances of Italy.

F. Waste

1. Sector overview

58. In 2011, emissions from the waste sector amounted to 17,520.85 Gg CO_2 eq, or 3.6 per cent of total GHG emissions. Since 1990, emissions have decreased by 10.9 per cent. The key driver for the fall in emissions is the national policy on waste, which focuses on reducing landfilling of waste and the expansion of landfill gas recovery. At the same time, waste incineration, as well as composting and mechanical and biological treatment, has increased due to the enforcement of legislation. Within the sector, 71.5 per cent of the emissions were from solid waste disposal on land, followed by 26.7 per cent from wastewater handling and 1.8 per cent from waste incineration. The remaining 0.03 per cent were from other (composting).

59. The waste sector inventory is complete with respect to the coverage of categories, gases and years, is accurate and in accordance with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. The methods and data used to estimate emissions for the waste sector are generally transparently described in the NIR. The ERT has identified some areas where transparency could be improved (see paras. 60 and 62 below).

60. The transparency of information on CO_2 emissions from recovered landfill gas has been improved in the 2013 submission with the provision of a detailed breakdown of the sources of biomass AD in the commercial/institutional subcategory in the energy sector (table 8.12 in the NIR). This table includes information relevant to other waste categories and the energy sector. To ensure transparency in all categories/subcategories, the ERT recommends that Italy appropriately reference table 8.12 in all relevant sections of the NIR in both the energy and the waste sector in its next annual submission.

61. The ERT commends Italy for addressing all the recommendations provided in the previous review report. Improvements in response to the previous recommendations include the provisions of additional information in the NIR on: the assumptions and methodologies used to distribute disposed waste between managed and unmanaged

landfills; the values and source information for the solid waste methane generation constants (k) used for different periods; and the allocation of CO_2 emissions from waste incineration between the energy sector (waste incineration with energy recovery) and the waste sector (waste incineration without energy recovery).

2. Non-key categories

Waste incineration – CO_2

62. When justifying the choice of the CO_2 EF for municipal waste (289.26 kg/t) in the NIR of the 2013 submission, Italy stated that the CO_2 EF for municipal waste has been calculated considering a carbon content equal to 23.0 per cent; moreover, on the basis of the Revised 1996 IPCC Guidelines and the average content analysis on a national scale reported by Federambiente (1992), a distinction was made between CO_2 from fossil fuels (generally plastics) and CO_2 from renewable organic sources (paper, wood, other organic materials). Only emissions from fossil fuels, which are equivalent to 35.0 per cent of the total, were included in the inventory. The ERT noted that the distribution of carbon content between fossil carbon and renewable carbon is actually presented in a report by De Stefanis (2002). In order to improve the transparency of the report, the ERT recommends that Italy replace the reference to Federambiente (1992) with De Stefanis (2002) in its next annual submission.

G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

1. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Overview

63. Table 6 provides an overview of the information reported and parameters selected by Italy under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 6
Supplementary information reported under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

		Findings and recommendations
Has the Party reported information in accordance with the requirements in paragraphs 5–9 of the annex to decision 15/CMP.1?	Sufficient	
Identify any elected activities under Article 3, paragraph 4, of the Kyoto Protocol	Activities elected: forest management Years reported: 2008, 2009, 2010, 2011	
Identify the period of accounting	Commitment period accounting	
Assessment of the Party's ability to identify areas of land and areas of land-use change	Not sufficient	Italy currently applies approach 2 for representing land areas to IPCC reporting method 1. This approach is not spatially explicit; hence, additional spatial information at the required spatial resolution is necessary to meet the reporting

	Findings and recommendations
	requirements of decision 16/CMP.1 Italy reported that a new system of identifying land using the national land-use inventory (IUTI) will be implemented in the 2014 submission to address this issue. The IUTI uses statistical sampling procedures to classify lands at three points in time (1990, 2008 and 2012). Where a land-use change has been detected in 2008, the classification is also performed for 2000. The process of collection, validation and verification of the 2012 IUTI data is currently ongoing. The ERT strongly recommends that Italy complete the IUTI and implement it in the 2014 submission so as to provide the necessary additional spatial data required to meet the reporting requirements of decision 16/CMP.1

Abbreviations: ERT = expert review team, IPCC = Intergovernmental Panel on Climate Change.

64. Although the emissions and removals from all KP-LULUCF activities have been estimated and reported in accordance with the IPCC good practice guidance for LULUCF, the inventory of KP-LULUCF activities is not complete. Italy has classified some forest plantations as cropland under the Convention and, as such, does not include these plantations under any of the mandatory or elected KP-LULUCF activities. For reporting under the Convention, the ERT has recommended that either all these plantations or only those consider longer rotations for timber production be reported as forest land (see para. 55 above). Following a similar rationale, the ERT recommends that Italy classify these plantations as forest and report them in the appropriate activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in the next annual submission. For example, forest plantations existing prior to 1 January 1990 should be reported under forest management, while plantations established on or after this date should be reported under afforestation/reforestation. Any human-induced conversion of these plantations that fulfils the definition of forest to non-forest land conversion should be reported as deforestation.

65. Italy has made recalculations for the KP-LULUCF activities between the 2012 and 2013 submissions following changes in AD and EFs and to rectify computation errors. The impact of these recalculations on each KP-LULUCF activity for the period 2008–2010 compared with the previous submission is as follows:

(a) Net removals from afforestation and reforestation increased by 1,970.25 Gg CO_2 (10.1 per cent);

(b) Net emissions from deforestation decreased by 38.87 Gg CO_2 (3.3 per cent);

(c) Net removals from forest management decreased by 17,974.09 Gg CO_2 (16.7 per cent).

Activities under Article 3, paragraph 3, of the Kyoto Protocol

Afforestation and reforestation – CO_2

66. Italy reported that "natural" afforestation and reforestation occurring on abandoned agricultural land was included in the reported activities under Article 3, paragraph 3, of the Kyoto Protocol. Italy justified this in the NIR, providing references to the legal framework (laws and law decrees) and afforestation grant programmes, which, it argued, supports the case that all natural forest regrowth is directly human-induced promotion of natural seed

sources. During the review, Italy explained that law decree 227/2001 prohibits not only the clear cut of naturally regrown forests but any timber removals from these lands without a permit. The ERT agreed that this regulatory framework provides a reasonable basis for the natural regeneration to be considered as directly human-induced, since even those landholders who are not part of the grant programmes would be making a decision to allow these lands to regrow to forest land and to become subject to this regulation which mandates keeping land under forest cover. Based on this information, the ERT concluded that the naturally regrown forests reported as afforestation and reforestation are correctly allocated because they are human induced. To improve transparency, the ERT recommends that Italy improve the explanation and justification for abandoned arable lands which are "naturally forested" to be reported as afforestation/reforestation consistent with decision 16/CMP.1. Specifically, Italy should elaborate how the decree 227/2001 protects all naturally regenerated forest.

67. In response to recommendations made in the previous review report, carbon stock changes in the dead wood pool for afforestation/reforestation (and forest management) have been estimated using country-specific data from a survey conducted by the Italian Forest Service. These estimates are now in line with the IPCC good practice guidance for LULUCF.

Deforestation – CO_2

68. The plantations currently reported under croplands are not covered by law decree 227/2001 and can be cut and the land converted to other uses. The ERT has recommended that these plantations be reported as forest land (see paras. 55 and 64 above). Therefore, the ERT recommends that the Party monitor land-use change in these plantation areas, as deforestation may occur or may have occurred in the past. The ERT also recommends that Italy provide information in the next annual submission on how deforestation of these lands is identified and reported, ensuring appropriate accounting of emission/removals.

Activities under Article 3, paragraph 4, of the Kyoto Protocol

Forest management – CO_2

69. The IPCC tier 1 method for mineral soils was applied for forest management and, as such, it is assumed that there is no change in carbon stocks. In order to demonstrate that this soil pool is not a net source, the carbon stock changes in mineral soils, under Article 3, paragraph 4, of the Kyoto Protocol, forest management activities, have been estimated from the above-ground carbon amount with linear relations. The ERT recommends that the Party provide further documentation on the adequacy of this approach to estimate changes in soil organic carbon for the national circumstances of Italy (see para. 56 above).

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

70. Italy has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings included in the standard independent assessment report (SIAR) on the SEF tables and the SEF comparison report.[6] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings contained in the SIAR.

[6] The SEF comparison report is prepared by the international transaction log (ITL) administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

71. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with decision 15/CMP.1, annex, chapter I.E, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism (CDM) registry and meets the requirements referred to in decision 22/CMP.1, annex, paragraph 88(a–j). The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

Calculation of the commitment period reserve

72. Italy has reported its commitment period reserve in its 2013 annual submission. Italy reported that its commitment period reserve has not changed since the initial report review (2,174,650,108 t CO_2 eq) as it is based on the assigned amount and not the most recently reviewed inventory. The ERT agrees with this figure.

3. Changes to the national system

73. Italy reported that there are no changes in its national system since the previous annual submission. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

4. Changes to the national registry

74. Italy reported that there are changes in its national registry since the previous annual submission. The Party described the changes, specifically due to the centralization of the EU ETS operations into a single EU registry operated by the European Commission called the Consolidated System of European Union Registries (CSEUR), in its NIR (see page 290). CSEUR is a consolidated platform which implements the national registries in a consolidated manner and was developed together with the new EU registry.

75. The ERT noted that there were recommendations in the SIAR related to CSEUR that had not been addressed, in particular recommendations related to the updating of publicly available information on the website, reporting a description of the changes in database structure and reporting of test results.

76. In response to questions raised by the ERT during the review, Italy provided further information, some confidential, on the changes to the national registry, including information that the publicly available information is now updated every two weeks; an updated copy of the data model; and the test results from the major release that occurred after the 2013 submission.

77. The ERT concluded that, taking into account the confirmed changes in the national registry, and the additional information provided to the ERT during the review, Italy's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol. With respect to the provision of information related to database structure specifically, the ERT encourages the Party to provide additional information in the NIR. The ERT recommends that Italy include all other additional information in response to the SIAR findings in its NIR in accordance with decision 15/CMP.1, annex, chapter I.G.

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

78. Italy has reported changes to its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The changes related to updated figures for CDM projects and financial resources. The ERT concluded that the information provided continues to be complete and transparent.

79. Italy has reported on how it is implementing its commitments under Article 3, paragraph 14, of the Kyoto Protocol, both individually and as a member State of the EU. Under the EU processes an impact assessment system has been established to accompany all new policy initiatives to ensure that adverse impacts are identified and minimized within the legislative process. Sustainability assessments are also undertaken on many of the CDM projects in which Italy participates. Through multilateral and bilateral cooperation with developing countries, Italy is funding promotion and projects on the efficient use of energy, implementation of innovative financial mechanisms, efficient water management, carbon sequestration, promotion of eco-efficient technology and professional training. The ERT commends Italy for providing very comprehensive information and analysis on these activities in the NIR.

III. Conclusions and recommendations

A. Conclusions

80. Table 7 summarizes the ERT's conclusions on the 2013 annual submission of Italy, in accordance with the Article 8 review guidelines.

Table 7
Expert review team's conclusions on the 2013 annual submission of Italy

		Paragraph cross-references
The ERT concludes that the inventory submission of Italy is complete (categories, gases, years and geographical boundaries and contains both an NIR and CRF tables for 1990–2011)		
Annex A sources[a]	Complete	
LULUCF[a]	Complete	48
KP-LULUCF	Not complete	64
The ERT concludes that the inventory submission of Italy has been prepared and reported in accordance with the UNFCCC reporting guidelines	Yes	
The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1	Yes	
The Party's inventory is in accordance with the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*	Yes	

		Paragraph cross-references
Italy has reported information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol	Yes	
Italy has reported information on its accounting of Kyoto Protocol units in accordance with decision 15/CMP.1, annex, chapter I.E, and used the required reporting format tables as specified by decision 14/CMP.1	Yes	
The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1	Yes	
The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions	Yes	
Did Italy provide information in the NIR on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol?	Yes	

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, CMP = Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, CRF = common reporting format, ERT = expert review team, IPCC = Intergovernmental Panel on Climate Change, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NIR = national inventory report, UNFCCC reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories".

[a] The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, or the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

B. Recommendations

81. The ERT identified the issues for improvement listed in table 8. All recommendations are for the next annual submission, unless otherwise specified.

Table 8
Recommendations identified by the expert review team

Sector	*Category*	*Recommendation*	*Paragraph cross-references*
Cross-cutting	Key category analysis (KP-LULUCF)	Provide additional information in the NIR to document why lands converted to settlements and grassland, and hence deforestation, are not identified as key under Kyoto Protocol reporting	Table 4
Energy	Feedstocks and non-energy use of fuels	Include in the NIR information on the specific calculation of the fractions of carbon oxidized	22
	Stationary combustion: solid fuels –	Include more detailed information in the NIR on how emissions from iron and steel are allocated between and within the energy and industrial processes sectors	25

Sector	*Category*	*Recommendation*	*Paragraph cross-references*
	CH_4		
	Stationary combustion: gaseous fuels, biomass – CO_2, CH_4, N_2O	Include in the NIR the explanation for the trends of the different gases for the category	26
	Stationary combustion: other fuels – CH_4	Include in the NIR the EFs used in all subcategories	27
	Fugitive emissions: oil and natural gas – CO_2, CH_4, N_2O	Review and correct the comments in the CRF tables	28
Industrial processes and solvent and other product use	Cement production – CO_2	Provide information on the underlying drivers for the change in IEFs since 2003 and on how time-series consistency has been maintained	Table 3, 32
		Provide information about the method used to determine process emissions from cement production under the EU ETS and indicate whether this method is based on kiln input or clinker output	32
	Iron and steel – CO_2	Include in the NIR details of the industry survey on the availability of data on process-related emissions from coke	33
	Consumption of HFCs and SF_6 – HFCs	Report domestic and commercial refrigeration separately in CRF table 2(II).Fs and document the factors used in the NIR	34
		Improve description of the methods and use a top-down approach to cross-check emission estimates	35
		Use the revised refrigeration and chiller product manufacturing and product life factors identified by the industry in the next annual submission and document the methods appropriately in the NIR by specifying the factors used for each application	37
	Lime production – CO_2	Provide additional information about the methods used to estimate emissions from lime production for the entire time series	38
		Provide information about the underlying drivers for the change in the IEF since 2005 and on how time-series consistency has been maintained	39
Agriculture	Manure management –	Document the methods used to adjust the uncovered storage EF, including information on the share of covered/uncovered storage and the emissions rate for	43

Sector	*Category*	*Recommendation*	*Paragraph cross-references*
	CH_4	covered storage systems	
		Review and revise the uncovered storage EF adjustment, as appropriate, to take into consideration changes in waste management through the time series	43
	Agricultural soils – N_2O	Provide crop production type and appropriate parameters for all relevant crop production categories	44
	Field burning of agricultural residues – CH_4, N_2O	Correct the identification of the methodology type in the NIR and in CRF table summary 3	45
LULUCF	Sector overview	Provided detailed explanations for all recalculations in future submissions	47
		Assess which type of cropland and grassland is converted to settlements and review use of notation keys	Table 3, 48
		Use the IUTI data to update the land-use matrices and recalculate the estimates for the period 1990–2011 in the next submission	50
	Forest land remaining forest land – CO_2	Improve the explanation of how the AD are derived	51
		Improve clarity of the NIR text regarding the method used for estimating stock changes in mineral soil	53
	Cropland remaining cropland – CO_2	Report all areas of plantations in forest land or alternatively disaggregate the areas of plantations and report in cropland only those considered very short rotations	Table 3, 55
	Land converted to settlements – CO_2	Correct the value of the carbon content of the biomass of woody crops	56
		Provide further documentation on the adequacy of the linear relation method for estimating soil organic content for the national circumstances of Italy	57
Waste	Sector overview	Reference biomass AD (table 8.12 in the NIR) in all relevant sections of the NIR in both the energy and the waste sector	60
	Waste incineration – CO_2	Provide the correct source reference for the distribution of fossil and renewable carbon in municipal waste	62
KP-LULUCF	Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol	Complete and implement the IUTI in the 2014 submission so as to provide the necessary additional spatial data required to meet the reporting requirements of decision 16/CMP.1	Table 6
		Report cropland plantations as forest in the appropriate activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol	64

Sector	*Category*	*Recommendation*	*Paragraph cross-references*
	Afforestation and reforestation – CO_2	Improve the explanation and justification for abandoned arable lands which are "naturally forested" to be reported as afforestation/reforestation consistent with decision 16/CMP.1	66
	Deforestation – CO_2	Monitor land-use change in the plantation areas to be reported as forest land, as deforestation may occur or may have occurred in the past	68
		Provide information in the next submission on how deforestation of plantations is identified and reported	68
	Forest Management – CO_2	Provide further documentation on the adequacy of the linear relation with above-ground biomass approach for estimating change in soil organic carbon	69
National registry		Provide additional information in response to the SIAR findings in the NIR	77

Abbreviations: AD = activity data, CRF = common reporting format, EFs = emission factors, EU ETS = European Union Emissions Trading System, IEFs = implied emission factors, IUTI = national land-use inventory, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NIR = national inventory report, SIAR = standard independent assessment report.

IV. Questions of implementation

82. No questions of implementation were identified by the ERT during the review.

Annex I

Background data on recalculations and information to be included in the compilation and accounting database

Table 9
Recalculations in the 2013 annual submission for the base year and the most recent year

Greenhouse gas source and sink categories	*1990*	*2010*	*1990*	*2010*	*Reason for the recalculation*
	Value of recalculation (Gg CO_2 eq)		*Per cent change*		
1. Energy	–97.00	–427.27	0.0	–0.1	Updates to AD, EFs; reallocation of emissions and inclusion of additional categories
A. Fuel combustion (sectoral approach)	–101.88	–518.78	0.0	–0.1	
1. Energy industries		–72.17		–0.1	
2. Manufacturing industries and construction	–355.05	–0.85	–0.4	0.0	
3. Transport	27.67	61.96	0.0	0.1	
4. Other sectors	225.50	–507.72	0.3	–0.5	
5. Other					
B. Fugitive emissions from fuels	4.89	91.51	0.0	1.2	
1. Solid fuels	5.08	1.32	4.2	2.0	
2. Oil and natural gas	–0.19	90.19	0.0	1.2	
2. Industrial processes		–133.12		–0.4	Updates to AD and EFs
A. Mineral products		–122.35		–0.7	
B. Chemical industry					
C. Metal production					
D. Other production					
E. Production of halocarbons and SF_6					
F. Consumption of halocarbons and SF_6		–10.76		–0.1	
G. Other					
3. Solvent and other product use	–0.40	18.49	0.0	1.1	Updates to AD and EFs
4. Agriculture	1.86	–18.58	0.0	–0.1	Updates to AD
A. Enteric fermentation					
B. Manure management					
C. Rice cultivation					
D. Agricultural soils	1.86	–20.00	0.0	–0.1	
E. Prescribed burning of savannas					

Greenhouse gas source and sink categories	*1990*	*2010*	*1990*	*2010*	*Reason for the recalculation*
	Value of recalculation (Gg CO_2 eq)		*Per cent change*		
F. Field burning of agricultural residues		1.42		8.7	
G. Other					
5. Land use, land-use change and forestry	22 330.46	13 189.65	–64.8	–23.3	Updates to AD, EFs and methods Inclusion of additional categories/pools
A. Forest land	1 202.44	1 699.98	–6.6	–4.3	
B. Cropland	17 215.32	11 190.22	–94.4	–90.4	
C. Grassland	3 923.56	281.48	–817.5	–3.7	
D. Wetlands					
E. Settlements	–10.86	17.97	–0.4	0.5	
F. Other land					
G. Other					
6. Waste	–165.89	–443.29	–0.8	–2.4	Updates to AD and reallocation of emissions
A. Solid waste disposal on land		–124.79		–1.0	
B. Wastewater handling	–0.96	–11.27	0.0	–0.2	
C. Waste incineration	–164.94	–307.21	–21.8	–50.7	
D. Other		–0.01		–0.3	
7. Other					
Total CO_2 equivalent without LULUCF	**–261.43**	**–1 003.77**	**–0.1**	**–0.2**	
Total CO_2 equivalent with LULUCF	**22 069.04**	**12 185.88**	**4.6**	**2.7**	

Abbreviations: AD = activity data, EFs = emission factors, LULUCF = land use, land-use change and forestry.

Table 10
Information to be included in the compilation and accounting database in t CO_2 eq for 2011, including the commitment period reserve

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	2 174 650 108			2 174 650 108
Annex A emissions for 2011				
CO_2	414 239 220			414 239 220
CH_4	36 567 662			36 567 662
N_2O	26 873 170			26 873 170
HFCs	9 306 044			9 306 044
PFCs	1 454 541			1 454 541
SF_6	351 381			351 381
Total Annex A sources	**488 792 018**			**488 792 018**
Activities under Article 3, paragraph 3, for 2011				
3.3 Afforestation and reforestation on non-harvested land for 2011	–6 462 691			–6 462 691
3.3 Afforestation and reforestation on harvested land for 2011	NA			NA
3.3 Deforestation for 2011	379 949			379 949
Activities under Article 3, paragraph 4, for 2011[c]				
3.4 Forest management for 2011	–23 976 982			–23 976 982
3.4 Cropland management for 2011				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2011				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2011				
3.4 Revegetation in the base year				

Abbreviations: Annex A = sources included in Annex A to the Kyoto Protocol, NA = not applicable.
[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 11
Information to be included in the compilation and accounting database in t CO_2 eq for 2010

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2010				
CO_2	425 499 380			425 499 380
CH_4	37 290 198			37 290 198
N_2O	27 075 621			27 075 621
HFCs	8 744 583			8 744 583
PFCs	1 330 834			1 330 834
SF_6	373 273			373 273
Total Annex A sources	**500 313 889**			**500 313 889**
Activities under Article 3, paragraph 3, for 2010				
3.3 Afforestation and reforestation on non-harvested land for 2010	–7 816 908			–7 816 908
3.3 Afforestation and reforestation on harvested land for 2010	NA			NA
3.3 Deforestation for 2010	378 742			378 742
Activities under Article 3, paragraph 4, for 2010[c]				
3.4 Forest management for 2010	–31 303 734			–31 303 734
3.4 Cropland management for 2010				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2010				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2010				
3.4 Revegetation in the base year				

Abbreviations: Annex A = sources included in Annex A to the Kyoto Protocol, NA = not applicable.
[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 12
Information to be included in the compilation and accounting database in t CO_2 eq for 2009

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2009				
CO_2	415 088 925			415 088 925
CH_4	38 013 005			38 013 005
N_2O	28 052 977			28 052 977
HFCs	8 163 938			8 163 938
PFCs	1 062 811			1 062 811
SF_6	398 018			398 018
Total Annex A sources	**490 779 673**			**490 779 673**
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009	–7 217 777			–7 217 777
3.3 Afforestation and reforestation on harvested land for 2009	NA			NA
3.3 Deforestation for 2009	376 965			376 965
Activities under Article 3, paragraph 4, for 2009[c]				
3.4 Forest management for 2009	–30 245 239			–30 245 239
3.4 Cropland management for 2009				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2009				
3.4 Revegetation in the base year				

Abbreviations: Annex A = sources included in Annex A to the Kyoto Protocol, NA = not applicable.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 13
Information to be included in the compilation and accounting database in t CO_2 eq for 2008

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2008				
CO_2	463 921 580			463 921 580
CH_4	38 191 595			38 191 595
N_2O	29 615 195			29 615 195
HFCs	7 512 979			7 512 979
PFCs	1 500 589			1 500 589
SF_6	435 535			435 535
Total Annex A sources	**541 177 473**			**541 177 473**
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008	–6 390 356			–6 390 356
3.3 Afforestation and reforestation on harvested land for 2008	NA			NA
3.3 Deforestation for 2008	375 396			375 396
Activities under Article 3, paragraph 4, for 2008[c]				
3.4 Forest management for 2008	–27 944 443			–27 944 443
3.4 Cropland management for 2008				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2008				
3.4 Revegetation in the base year				

Abbreviations: Annex A = sources included in Annex A to the Kyoto Protocol, NA = not applicable.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Annex II

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>.

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories". FCCC/SBSTA/2006/9. Available at <http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>.

"Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention". FCCC/CP/2002/8. Available at <http://unfccc.int/resource/docs/cop8/08.pdf>.

"Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol". Decision 19/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

"Guidelines for review under Article 8 of the Kyoto Protocol". Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

Status report for Italy 2013. Available at <http://unfccc.int/resource/docs/2013/asr/ita.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2013. Available at <http://unfccc.int/resource/webdocs/sai/2013.pdf>.

FCCC/ARR/2012/ITA. Report of the individual review of the annual submission of Italy submitted in 2012. Available at <http://unfccc.int/resource/docs/2013/arr/ita.pdf>.

Standard independent assessment report, parts 1 and 2. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Riccardo De Lauretis, Ms. Daniela Romano and Ms. Marina Vitullo (ISPRA), including additional material on the methodology and assumptions used. The following documents[1] were also provided by Italy:

Analisi del mercato della refrigerazione e del condizionamento in Italia nel periodo 1990-2013, verbale incontro, Roma, 7 novembre 2013.

Baldini S. Kellezi M., Kortoci Y., *Caratterizzazione della biomass di poppio e robinia a ciclo breve (Short rotation forestry)*. Dipartimento di tecnologie, ingegneria e scienze dell'Ambiente e delle Foreste, Università della Tuscia, Viterbo.

CESTAAT,1998. *Impieghi dei sottoprodotti agricoli ed agroindustriali.*

CRA-MPF. *INFC, Inventario Nazionale delle foreste e dei serbatoi forestali di carbonio.* Metodi e risultati. 2012.

Di Matteo, G., Sperandio, G. and Verani, S. (2012). *Field performance of poplar for bioenergy in southern Europe after two coppicing rotations: effects of clone and planting density*. iForest, 5: 224-229.

De Stefanis. P. 2002. *Metodologia Di Stima Delle Emissioni Di Gas Serra Dalla Combustione Di Rifiuti*. Roma: ENEA. Available at http://www.ati2000.it/index.php?page=pubblicazioni&view=8383.

Federambiente, 1992. *Analisi Dei Principali Sistemi Di Smaltimento Dei Rifiuti Solidi Urbani.*

Federici S. et al. 2008. *An approach to estimate carbon stocks change in forest carbon pools under the UNFCCC: the Italian case*. iForest 1: 86-95.

Inventario annual delle emission di HFC, PFC, SF_6, Milano, 24 settembre 1999.

Inventario annuale emissioni HFC, Milano, 8 gennaio 2001.

ISPRA, 2013. *Quality Assurance/Quality Control Plan for the Italian Emission Inventory. Year 2013*. Institute for Environmental Protection and Research.

MAF/ISAFA, 1988. *Inventario Forestale Nazionale. Sintesi metodologica e risultati. Ministero dell'Agricoltura e delle foreste.* Istituto Sperimentale per l'assestamento forestale e per l'Alpicoltura, Trento.

Piano nazionale di attenzione della Convenzione sui Cambiamenti Climatici, Milano, 16 dicembre 1994.

[1] Reproduced as received from the Party.

Annex III

Acronyms and abbreviations

AD	activity data
CDM	clean development mechanism
CH_4	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
CSEUR	Consolidated System of European Union Registries
EF	emission factor
ERT	expert review team
EU	European Union
EU ETS	EU emissions trading scheme
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
KP-LULUCF	LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
N_2O	nitrous oxide
NE	not estimated
NFI	national forest inventory
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
UNFCCC	United Nations Framework Convention on Climate Change